North Dakota Department of Health

VIRAL HEMORRHAGIC FEVERS

BUNYAVIRUSES

The viruses of the bunyavirus family have long presented a challenge to taxonomists and medical doctors alike. The *Hantavirus* genus, distinct because it is not transmitted via an insect vector, and the *Bunyavirus, Nairovirus* and *Phlebovirus* genera, collectively grouped because they are transmitted via an insect vector, have presented an infectious threat to humans throughout time.

The ecology of the bunyavirus family viruses has a significant effect on the understanding of the disease transmission and epidemiology. Because each disease tends to be endemic to a particular region with its specific virus, reservoir and vector, the general population of the region typically is exposed throughout life to the virus. This has been of significance during wars – the Napoleonic Wars, World War II and the Korean War – when nonnative troops without previous exposure to the virus enter areas where the virus is endemic. Hantaan virus killed nearly 10 percent of the United Nations soldiers it infected in Korea in 1951; sandfly fever viruses caused epidemics in the Allied troops in W.W.II and the soldiers of the Napoleonic wars.

More recently, the hantaviruses associated with rodents have become the focus of attention. In 1993, the Sin Nombre virus associated with the Four Corner's disease was identified in the southwestern region of the United States. Because of their different modes of transmission and the resulting low level of exposure to even indigenous people, hantaviruses cause disease in people who become exposed to the virus at high enough concentrations.

Most of the more than 300 members of the *Bunyaviridae* family are arthropod-borne. The specific vectors and life cycles differ but typically involve mammalian and avian reservoir hosts with arthropod vectors. Transovarial transmission among these arthropods is an important process for overwintering. For example, the virus in an infected female arthropod infects the eggs so that the larvae, nymphs and adults of the following generations are infected and capable of transmitting the virus to vertebrate hosts. Humans become infected when bitten by the arthropod – typically a mosquito or a tick. In the genus *Hantavirus*, the viruses are transmitted by urine, saliva and fecal material of rodents. Humans become infected when they come into contact with these rodents or inhale the aerosolized particulate matter. Most of the viruses are not transmissible from human to human. The Crimean-Congo hemorrhagic fever virus (CCHF) is, however, transmitted among humans.

Viral hemorrhagic fevers caused by viruses in the bunyavirus family include Crimean-Congo hemorrhagic fever, hantavirus pulmonary syndrome, hemorrhagic fever with renal syndrome and Rift Valley fever.

For more information, call the North Dakota Department of Health at 701.328.2378.